Electronic Version
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Claims

[c1] 1. A device for encoding a bit stream of data bits of a binary source signal into a stream of data bits of a binary channel signal, m-bit source words are converted to n-bit codeword, the device comprising:
converting means used to convert source words having a variable word length with a basic word length of m bits and a total word length of m*i bits into n*i-bit codewords, i being an integer of at least 1;
wherein the converting means limits a characteristic of the codeword specified for each starting bit position in the code word.

[c2] 2. The device of claim 1, wherein the converting means preserves the parity of the m-bit source words over the codeword.

[c3] 3.The device of claim 1, wherein the converting means limits a maximum number of repeating bit patterns specified for each starting bit position in the codeword.

[c4] 4.The device of claim 1, wherein the converting means limits a maximum number of the consecutive appearances of the minimum run of zeros d for each starting

bit position in the codeword.

[c5] 5.The device of claim 1, wherein the converting means limits a maximum run of zeros k for each starting bit position in the codeword.

[c6] 6.The device of claim 1, wherein the codeword are a variable length code (d, k_{VAR}; m, n; r; $RMTR_{VAR}$), wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c7] 7.The device of claim 6, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (3,4,3);

k_{VAR} = (6,7,7);

m = 2;

n = 3; and

r = 5.

[c8] 8.The device of claim 6, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (4,5,4);

$k_{VAR}r$ = (6,7,6);

m = 2;

n = 3; and

r = 5.

[c9] 9.The device of claim 1, wherein the converting means determines the codeword by referring to an immediately succeeding string of m-bit source words.

[c10] 10.The device of claim 1, wherein the converting means determines the codeword by referring to an immediately preceding code word.

[c11] 11. A device for decoding a bit stream of data bits of a binary channel signal into a stream of data bits of a binary source signal, n bits channel codeword are converted to m-bit source words, the device comprising:
converting means used to convert codeword having a variable code length with a basic code length of n bits and a total code length of n*i bits into m*i-bit source words, i being an integer of at least 1;
wherein the bit stream of channel code words have a characteristic specified for each starting bit position in the code word.

[c12] 12.The device of claim 11, wherein the converting means

preserves the parity of the codeword over the m-bit source words.

[c13] 13.The device of claim 11, wherein the codeword are limited with a maximum number of repeating bit patterns specified for each starting bit position.

[c14] 14.The device of claim 11, wherein codeword are limited with a maximum number of the consecutive appearances of the minimum run of zeros d for each starting bit position in the codeword.

[c15] 15.The device of claim 11, wherein codeword are limited with a maximum run of zeros k for each starting bit position in the codeword.

[c16] 16.The device of claim 11, wherein the codeword are a variable length code (d, k_{VAR}; m, n; r; $RMTR_{VAR}$), wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c17] 17.The device of claim 16, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (3,4,3);

k_{VAR} = (6,7,7);

m = 2;

n = 3; and

r = 5.

[c18] 18.The device of claim 16, wherein the variable length code comprises:

d = 1;

RMTR = (4,5,4);

kvar = (6,7,6);

m = 2;

n = 3; and

r = 5.

[c19] 19.The device of claim 11, wherein the converting means determines the m-bit source words by referring to an immediately succeeding string of codeword.

[c20] 20. A method for encoding a bit stream of data bits of a binary source signal into a stream of data bits of a binary channel signal, m-bit source words are converted to n-bit codeword, the method comprising:
converting source words having a variable word length with a basic word length of m bits and a total word length of m*i bits into n*i-bit codewords, i being an integer of at least 1; and

limiting a characteristic of the codeword specified for each starting bit position in the code word.

[c21] 21.The method of claim 20,further comprising preserving the parity of the m-bit source words over the codeword.

[c22] 22.The method of claim 20,wherein limiting a characteristic of the codeword further comprises limiting a maximum number of repeating bit patterns specified for each starting bit position in the codeword.

[c23] 23.The method of claim 20, wherein limiting a characteristic of the codeword further comprises limiting a maximum number of the consecutive appearances of the minimum run of zeros d for each starting bit position in the codeword.

[c24] 24.The method of claim 20, wherein limiting a characteristic of the codeword further comprises limiting a maximum run of zeros k for each starting bit position in the codeword.

[c25] 25.The method of claim 20, wherein the codeword are a variable length code (d, k_{VAR}; m, n; r; $RMTR_{VAR}$), wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword,

and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c26] 26.The method of claim 25, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (3,4,3);

k_{VAR} = (6,7,7);

m = 2;

n = 3; and

r = 5.

[c27] 27.The method of claim 25, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (4,5,4);

k_{VAR}r = (6,7,6);

m = 2;

n = 3; and

r = 5.

[c28] 28.The method of claim 20, further comprising determining the codeword by referring to an immediately succeeding string of m-bit source words.

[c29] 29.The method of claim 20, further comprising deter-

mining the codeword by referring to an immediately preceding code word.

[c30] 30. A method for decoding a bit stream of data bits of a binary channel signal into a stream of data bits of a binary source signal, n bits channel codeword being converted to m-bit source words, and the method comprising:
converting codeword having a variable code length with a basic code length of n bits and a total code length of n*i bits into m*i-bit source words, i being an integer of at least 1; and
specifying a characteristic for each starting bit position in the channel code words.

[c31] 31.The method of claim 30, further comprising preserving the parity of the codeword over the m-bit source words.

[c32] 32.The method of claim 30, wherein the codeword are limited with a maximum number of repeating bit patterns specified for each starting bit position in the codeword.

[c33] 33.The method of claim 30, wherein the codeword are limited with a maximum number of consecutive appearances of a minimum run of zeros d specified for each

starting bit position in the codeword.

[c34] 34.The method of claim 30, wherein the codeword are limited with a maximum run of zeros k specified for each starting bit position in the codeword.

[c35] 35.The method of claim 30, wherein the codeword are a variable length code (d, k_{VAR}; m, n; r; $RMTR_{VAR}$), wherein r is a maximum value of i and is at least 2, d is a minimum run of zeros, k_{VAR} is a maximum run of zeros specified for each starting bit position in the codeword, and $RMTR_{VAR}$ is a maximum number of consecutive appearances of the minimum run of zeros d specified for each starting bit position in the codeword.

[c36] 36.The method of claim 35, wherein the variable length code comprises:

d = 1;

$RMTR_{VAR}$ = (3,4,3);

k_{VAR} = (6,7,7);

m = 2;

n = 3; and

r = 5.

[c37] 37.The method of claim 35, wherein the variable length code comprises:

d = 1;

RMTR = (4,5,4);

kvar = (6,7,6);

m = 2;

n = 3; and

r = 5.

[c38] 38.The method of claim 30, further comprising determining the m-bit source words by referring to an immediately succeeding string of codeword.